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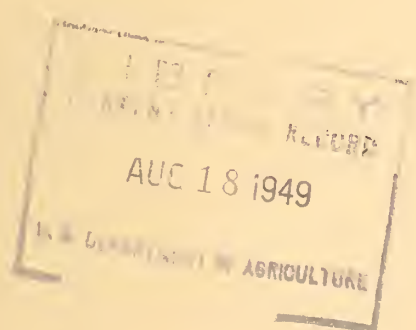


# FOREIGN AGRICULTURE REPORT

OFFICE OF  
FOREIGN AGRICULTURAL RELATIONS  
U.S. DEPARTMENT OF AGRICULTURE  
5a WASHINGTON, D.C.



## <sup>3</sup>0 SAO PAULO COTTON; <sub>11</sub> FACTORS AFFECTING TRENDS IN PRODUCTION AND TRADE<sub>11</sub>



by

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## FOREWORD

Brazil, more specifically the State of Sao Paulo, is the leading foreign source of American Upland type cotton moving into export markets in direct competition with United States cotton. Much of the Sao Paulo cotton that is sold abroad is handled by firms that also export United States cotton. Thus, the cotton growing industry of the United States is vitally interested in developments in Brazil that have a bearing on the level of exports of Brazilian cotton.

In order to appraise the situation, P. K. Norris, Cotton Specialist of this Office, went to Brazil to conduct a first-hand study of factors that may affect the levels of production and exports of Sao Paulo cotton. This report summarizes Mr. Norris' observations.

This study was conducted under the provisions of the Research and Marketing Act of 1946. The possibilities of broadening the foreign market for other agricultural commodities are also being studied by this Office, and the findings are presented in other circulars and reports that may be obtained, free, from the Office of Foreign Agricultural Relations, United States Department of Agriculture, Washington 25, D. C.

A handwritten signature in dark ink, reading "Joseph A. Becker". The signature is written in a cursive, flowing style with a large initial "J".

Joseph A. Becker, Chief  
International Commodities Branch

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## A C K N O W L E D G M E N T S

This report is based largely upon information collected in 1948. The unpublished reports of Henry W. Spielman, formerly Agricultural Economist, American Consulate General, Sao Paulo, and now Consular Attaché (Agricultural) American Consulate, Bombay, India, of Guy L. Bush, Agricultural Attaché, Rio de Janeiro, and Oscar K. Moore, Agricultural Officer, American Consulate General, Sao Paulo, have been useful. The author wishes to express his appreciation for the many services given by Mr. Bush and Mr. Moore and their staffs. He is also indebted to other Foreign Service officers in Brazil and to many individuals, both American and Brazilian, who supplied data pertinent to this study.

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FIGURE 1.- Turning cotton, to facilitate drying, on an old coffee-drying floor in Sao Paulo. Much of the Sao Paulo cotton is dried in the open air before ginning.



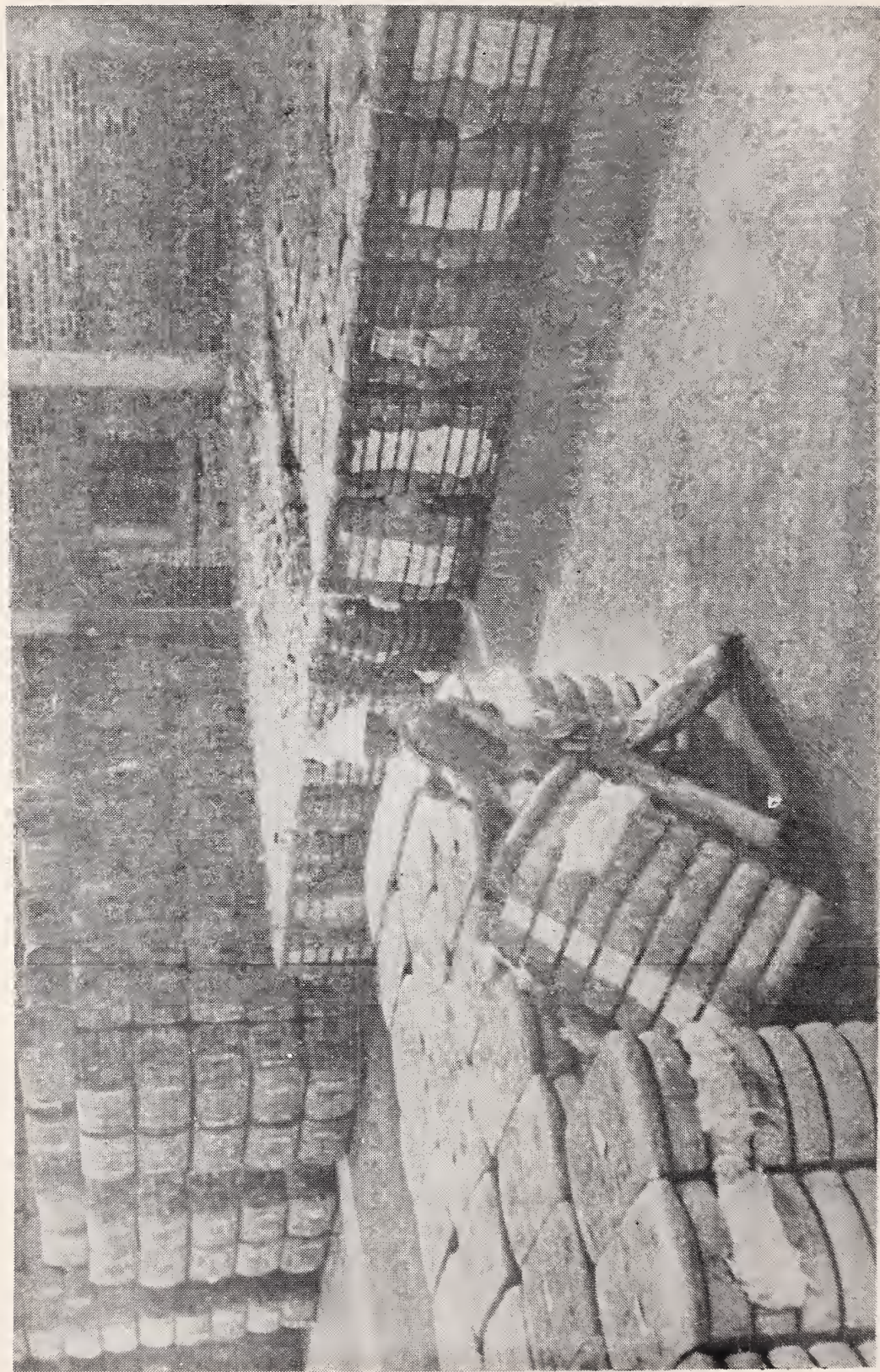


FIGURE 2.- Gin-pressed cotton bales in storage in Sao Paulo. The Brazilian bale is pressed to a density of 28 to 30 pounds per cubic foot at the gin, and export bales are compressed to a higher density at a central compress.



# SAO PAULO COTTON

by

P. K. Norris, Agricultural Economist

Brazil has long ranked as the largest producer of cotton in the Southern Hemisphere, and, among the nations of the world, has in the past two decades stood second only to the United States as an exporter of cotton of American Upland type. While the world is indebted to northern Brazil for originating cotton of the Egyptian and Sea Island types, the industry of southern Brazil is based on varieties introduced from the United States and adapted to the Brazilian environment.

Between the United States and Brazil, there has thus naturally grown up a mutual interest in the progress achieved in cotton production, in the problems encountered, and in the policies evolved in both countries. In the pursuit of this interest, Youngblood<sup>1</sup> in 1922 studied the overall potentialities of cotton growing in Brazil from the standpoints primarily of land resources, climatic conditions, population, and transportation. In 1934, Norris<sup>2</sup> studied the expansion of cotton growing and especially the influence of the decline of coffee prices at that time. Herrmann<sup>3</sup> in 1939 made observations on the control of varieties and on ginning and marketing organization and methods. In 1940, Norris revisited Brazil. Spielman,<sup>4</sup> while serving as Agricultural Officer of the Consulate General at Sao Paulo, reported on the Brazilian cotton situation.

Beginning about 1930 the trend of cotton production in Brazil was upward, the State of Sao Paulo accounting for the increase. In 1943-44 the total Brazilian crop reached a peak figure of 2.7 million bales, of which 2.1 million bales were grown in Sao Paulo. At that point, however, an abrupt decline in production occurred largely in Sao Paulo and, notwithstanding the incentive of high postwar prices, total production in Brazil in 1947-48 was less than half that of 1943-44, actually only 1.3 million bales. Meanwhile, consumption in Brazilian mills had greatly increased, and a large wartime accumulation of stocks had been successfully exported.

The effect of these developments was to reduce the surplus for export from about 2,000,000 bales in 1943-44 to something approximating 500,000 bales at the new level of production. To learn in what respect prevailing conditions might be temporary or of long duration, and how

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<sup>1</sup> YOUNGBLOOD, BONNEY. THE POSSIBILITIES OF BRAZIL AS A COMPETITOR OF THE UNITED STATES IN COTTON GROWING. Texas Agricultural Experiment Station Bulletin No. 345. July 1926.

<sup>2</sup> NORRIS, P. K. COTTON PRODUCTION IN SOUTHERN BRAZIL. U. S. Department of Agriculture. Foreign Service 63. May 1935.

<sup>3</sup> HERRMANN, OMER W. SOUTH BRAZIL, NEW LAND OF COTTON. U. S. Department of Agriculture, Farm Credit Administration. Circular C-117. May 1940.

<sup>4</sup> SPIELMAN, HENRY W. [Unpublished Reports] American Consulate General Sao Paulo. 1942-45.

the future course of cotton production in that country might be affected the author again visited Brazil from June to September 1948. This publication reports the results of that study, which was confined largely to an appraisal of the situation and probable developments in Sao Paulo.

### SAO PAULO: CHIEF SOURCE OF BRAZILIAN COTTON

The production of cotton in Brazil antedates the development of the industry in the United States. About 1750 the planters of northeast Brazil brought in natives of India to train their slaves to grow and spin cotton. Within a few years, cotton was one of the leading crops and an important item in the export trade of Brazil.

Exports of Brazilian cotton to Europe increased until about 1820 when the United States became a factor in that market. During the expansion of the cotton-growing industry in the United States in the period preceding the Civil War, cotton exports from Brazil dropped to an insignificant level. During the Civil War, however, and for several years afterward, little cotton was exported from the United States and world cotton prices rose to record levels. This stimulated production of the crop in Brazil and, for a time, cotton exports from that country increased; but, with the return to normal conditions, Brazilian cotton largely disappeared from export markets. About 1900 the Brazilian textile industry began to expand, and the resulting local demand for cotton, together with low prices of coffee, rubber, and other crops that prevailed at that time, again stimulated interest in the production of cotton.

Until the early 1930's, cotton production had been confined chiefly to the northeastern States of Brazil. About this time, because of the unfavorable coffee market, farmers in the coffee-growing State of Sao Paulo became interested in growing cotton. Within a few years, the center of production shifted to Sao Paulo, which, today, is the leading cotton-growing State of Brazil, ranks as one of the important producing areas of the world, and is the source of most of the cotton exported from Brazil.

### COTTON PRODUCTION AND GOVERNMENT POLICY

For several years prior to 1930, coffee, the chief crop of Sao Paulo and the leading export crop of Brazil, was "depressed." Exporters of Brazilian coffee were finding it increasingly difficult to sell abroad. World coffee prices were at a low level, and the domestic supply was increasing. The Brazilian Government, therefore, in addition to its policy of supporting coffee prices, adopted a policy of encouraging the diversification of agriculture. Cotton became the principal substitute crop for coffee. Both the Federal and State Governments engaged in developing a rather loose program looking to the expansion of cotton production in the State of Sao Paulo.

Much of the State activity had to do with the operation of an experiment station where a study of the problems of cotton production

was undertaken. The development of suitable varieties, the distribution of seed, and the control of ginning and classing were largely State activities although the Federal Government did cooperate in some of these services.

The Federal Government's part of the program was largely designed to encourage the exportation of cotton in an effort to offset, in part, the loss of coffee exports. In order to do this, a special rate of exchange for cotton exports was established and maintained during the early years of the cotton development. This enabled exporters of cotton to sell at the world price while paying a higher domestic price. Also, the Federal Government, through a high tariff policy, was able to keep the bulk of foreign textiles out of the country. Since about 1933 the local textile mills have supplied 90 to 95 percent of the cotton goods consumed in the country.

In years of low prices, loans to support the price of cotton were made through Federal banks. Cotton-ginning machinery was admitted duty free, and other inducements were given to develop the physical plant for handling the cotton crop. This type of Government encouragement, along with the economic condition of the coffee growers in the 1930's, made it possible for thousands of farmers to turn to cotton.

### ACREAGE, PRODUCTION, AND YIELDS

Expansion of the cotton acreage and consequently of production of cotton in Sao Paulo was rapid during the 1930's (table 1). In 1932-33, Sao Paulo produced only 160,000 bales, one-third of the total Brazilian crop of 481,000 bales. In 1937-38, Sao Paulo contributed 1,145,000 of

TABLE 1. - Sao Paulo cotton: Area, production, and yield annual, 1930-31 to 1948-49

CROP YEAR	AREA	PRODUCTION	YIELD
August 1 to July 31	Acres	Bales of 500 lbs. gross	Pounds per acre
1930-31. . . . .	148,260	48,427	156
1931-32 . . . . .	228,091	98,035	205
1932-33 . . . . .	299,379	160,262	256
1933-34 . . . . .	971,830	471,803	232
1934-35 . . . . .	1,355,416	452,944	180
1935-36 . . . . .	2,223,518	815,471	175
1936-37 . . . . .	2,578,343	934,501	184
1937-38 . . . . .	2,596,190	1,145,174	187
1938-39 . . . . .	2,230,401	1,260,330	185
1939-40 . . . . .	2,647,261	1,417,664	256
1940-41 . . . . .	2,742,130	1,756,148	306
1941-42 . . . . .	3,222,645	1,303,689	193
1942-43 . . . . .	3,280,252	1,730,002	252
1943-44 . . . . .	3,681,244	2,136,839	277
1944-45 . . . . .	3,789,054	1,073,124	135
1945-46 . . . . .	2,555,840	876,280	164
1946-47 . . . . .	3,137,394	804,932	123
1947-48 . . . . .	2,615,652	686,000	126
1948-49 . . . . .	2,088,000	964,931	222

Source: Official U. S. Consular reports and cables.



Brazil's 2,075,000-bale crop, and 5 years later (1942-43) Sao Paulo produced 1,730,000 of the total crop of 2,172,000 bales. Peak production was reached in Sao Paulo in 1943-44 when that State produced 2,137,000 of Brazil's 2,700,000-bale crop. Production declined during the next four seasons to 686,000 bales in Sao Paulo and 1,260,000 bales in the country in 1947-48. The 1948-49 crop is forecast at 965,000 bales in Sao Paulo and 1,465,000 bales in Brazil.

Average annual yields per acre fluctuated widely from year to year. Since 1930-31, yields are reported to have ranged between 123 and 306 pounds per acre (table 1). The average is a little more than 200 pounds per acre.

Annual yields seem to follow a pattern or series of high and low years. For example, during the 3 years from 1931-32 to 1933-34, annual yields averaged 231 pounds per acre. From 1934-35 to 1938-39, yields ranged from 175 to 187 pounds and averaged 183 pounds per acre. During the next 5 years, 1939-40 to 1943-44, the range was between 193 pounds and 306 pounds, with an average of 257 pounds per acre. From 1944-45 to 1947-48, yields were low, averaging only about 137 pounds per acre. The average yield in 1948-49 is estimated at 222 pounds per acre.

It appears that yields per acre influence to a considerable degree the area planted to cotton in the following year. While the cotton acreage of the State has increased rapidly since 1930-31, most of the increase has occurred during periods of above-average yields. In periods of low average yields, farmers tended to reduce or failed to expand acreage at the same rate as in periods of higher yields. From 1931-32 to 1933-34, when yields averaged 231 pounds per acre, the planted acreage increased from 299,000 acres in 1932-33 (the first season following the first year of the higher yields in this series) to 1,355,000 acres in 1934-35 (the planting season following the last year of the higher-yield series). This was a period of very rapid acreage expansion.

Yields during the period 1934-35 to 1938-39 averaged 183 pounds, and the acreage planted during the seasons influenced by this period increased from 2,224,000 acres in 1935-36 to 2,647,000 acres in 1939-40 - an increase of only 424,000 acres during the 5 years compared with the increase of 1,056,000 acres during the previous 3 years of higher yields.

From 1939-40 to 1943-44, a 5-year period of the highest average yields on record, 257 pounds per acre, the planted area increased a little more than a million acres.

From 1944-45 to 1947-48, when average yields were only 137 pounds per acre, the planted acreage declined about 1,170,000 acres. Of course there are many factors other than low yields responsible for decreased cotton acreage, but it seems that a series of low-yield years results in a decrease of acreage and that a series of years of above-average yields brings an increase in acreage.

During the period of rapid expansion of cotton production in Sao Paulo, some increase occurred in the States bordering on Sao Paulo. But, on the whole, the production of these States was not significant in the total crop of the country. The State of Sao Paulo is responsible almost entirely for the place Brazil holds in the world cotton markets today.

## FACTORS AFFECTING ACREAGE AND YIELD

### Planting, Cultivating, and Harvesting

Much of the cotton planted in Sao Paulo after 1930 was planted on "new" land recently cleared of trees or other vegetation. The most common method of doing this was to cut the timber, pile the brush in large drifts, and burn it. Little effort was made to remove roots and stumps because only a small part of the new land was plowed. In cases where land was plowed, both moldboard and disk plows were used. A few tractors are now in use. But, on the whole, the average cotton farmer has little in the way of equipment and farm tools.

In recent years, some progress has been made in the use of mechanical equipment for clearing and plowing new land. Two or three companies having large investments in cotton gins, compresses, warehouses, and oil mills are now engaged in clearing and plowing land for cotton farmers on a fee basis. These companies have large-type tractors, bulldozers, and other equipment and move them from farm to farm. Once the land is cleared and plowed the average farmer can plant and cultivate more land than would be the case if the clearing was done by hand labor.

The crop is planted from September to December, but the most favorable month seems to be October. Farmers try to get their cotton planted during this month. In certain years when spring rains are late, however, there is a good deal of late planting. In years when rainfall is heavy at planting time, it is often necessary to replant.

Most of the crop is planted by hand; that is, the workers go into the field and drop the seed by hand. Usually, one man makes a hole, a second man follows and drops the seeds, covering them with his foot. Generally, the plants are from 30 to 40 inches apart in the row, and rows are 5 to 7 feet apart. The number of plants per acre is less than in the United States.

The cotton is usually thinned by pulling out the excess plants by hand. Cultivation consists of keeping the weeds and grass down with a hoe, although the use of horse-drawn cultivators, chiefly of the one-row type, is becoming more common.

Fertilizer is almost unknown to the average Brazilian cotton farmer. In a few cases where it has been used, some types have proved profitable. On new land, it is felt that nitrogen fertilizer is not necessary, although experimental data indicate that most Brazilian soils do respond to a complete fertilizer.

As stated, hand cultivation - using a hoe - is the chief method of removing weeds and grass from the fields. This is a carry-over from the system of cultivation used on the large coffee plantations. The whole family may work at the job of harvesting the crop. But, as a rule, the task of cutting down trees and clearing and cultivating the land is rather strenuous, and women are not employed in this operation.

Picking may begin as early as March and continue into June and July. April, May, and June, however, are the chief harvest months. On the whole, the average Brazilian picker picks considerably less per day than a

picker in the United States. A common practice is to pick one side of the row at a time and to put the seed cotton into a basket, bucket, or container of some sort. The use of the picking sack is almost unknown.

## Climate

Because of its elevation the climate of Sao Paulo is, as a rule, pleasant. Temperatures as high as 110° F. have been recorded during the summer months, however. Temperatures seldom drop below freezing, but frosts have occurred on a few occasions during past years. Yields of cotton have not been affected by low temperatures.

Rainfall is adequate, varying from about 35 to 50 inches annually. There are two rather well-defined seasons - the dry season from March to September, corresponding to the cotton-harvesting season, and the wet season from September to February, corresponding to the growing season. Because the temperatures are not low enough to kill the cotton plant, the dry season acts to check its growth. As a result the crop is ready to pick a short time after the dry season opens. At times, however, the dry season began too early, and as a result yields were reduced. During other years the wet season has extended into the harvest period, and the growth of the crop was not checked with the result that yields were also affected. On the whole, however, climatic conditions throughout Sao Paulo are as favorable for cotton production as in any rain-grown area of equal size in the United States.

## Land

The State of Sao Paulo comprises an area of approximately 95,500 square miles. This is but slightly less than the combined area of Louisiana and Arkansas. In the chief agricultural areas of the State, the elevation ranges from about 3,500 feet along the western slopes of the coastal mountains to about 1,000 feet along the western border. Most of the State is drained by streams flowing into the Parana River. The topography is similar to much of the Piedmont area of the United States and comprises a series of rolling hills, ridges, low mountains, and narrow valleys. There are no broad, level plains or wide river valleys.

The soils of Sao Paulo range from the heavy red clay soils of the "coffee country" in the eastern and central sections to the lighter clay and sandy soils of the hills and ridges of the western part of the State. At one time, most of the soils contained fair amounts of organic matter, but after the land was cleared of its virgin forests and put under cultivation much of the humus and plant food disappeared. In certain sections of the State, where land has been cropped for years, erosion is a serious problem.

At the beginning of the expansion of cotton acreage and production in 1930-31, it was estimated that there were available for new cultivation in Sao Paulo some 10 million acres. A part of this was in the older areas where agriculture had been established for many years. But much



of it was in the newer or less-developed western and northern sections of the State. It is on this undeveloped area of reasonably fertile land that much of the cotton crop has been produced.

## Labor

Although there have always been large numbers of "hands" on the coffee plantations of Sao Paulo, there has never been an oversupply of laborers in relation to the developed farming area. During the years of development of the coffee-growing industry, immigration was heavy. Thousands of Italians, Spaniards, and Portuguese settled in Sao Paulo and became workers on the coffee plantations. Later the Japanese settled in the sparsely populated areas of the State. Most of these people became tenants who cleared land and planted cotton. A few of them became landowners. In the early 1930's, it was estimated that 40 percent of the cotton was produced by the Japanese, who cleared the land, grew two or three crops, then moved on west to new land and repeated the operation.

In addition to the immigrants, thousands of Brazilians from the northeastern states moved to Sao Paulo. Many of these people worked for a few years on the cotton plantations, then returned to their homes. At one time the State Government of Sao Paulo maintained a kind of employment service for them.

During the period from about 1930 to 1940, most of the laborers who came into the State grew cotton, working either as "hired help" or tenants. Because of the low wages on the coffee plantations, large numbers of "coffee hands" also turned to cotton growing. They merely shifted from hired coffee workers to cotton tenants. It seems that the worker on the average coffee plantation takes very well to cotton production.

On most coffee plantations the care of the coffee trees and the picking of the crop is largely the responsibility of the entire family. A family is paid a fixed wage for cultivating and harvesting the crop from a fixed number of coffee trees. Cotton could, therefore, be grown in much the same way. A fixed amount of land was blocked off for each family who cleared, planted, cultivated, and picked the crop. The men, as a rule, did the work of planting and growing the crop, but the women and children helped with the picking.

It is estimated that 200,000 persons are now employed on cotton farms, while at the peak of cotton production, some 400,000 were engaged in the growing of cotton. Many of these workers found employment in the building industry in Sao Paulo and other Brazilian cities during and since the recent war period.

The higher wages paid for work in the cities and towns is not the only reason for the shift from country to city. Living conditions on the average farms or in the plantation village are rather primitive. Housing may be little if any better in the city, but there is a larger neighborhood and some entertainment if nothing more than a picture show. City life has an appeal to the average rural family.

## Variety and Seed Program

All of the cotton grown in Sao Paulo is of the American Upland varieties. It is similar in many respects to the cotton produced in the United States. There are only two varieties being grown in the State on a commercial scale at the present time, but a third variety is being propagated for release in increasing quantities. Both of the old varieties were developed in Brazil from seed originally imported from the United States, and both are of approximately the same staple length. One variety is well adapted to the thin, sandy, hill soils, while the other is said to be equally adapted to richer soils of the narrow valleys and creek bottoms. The staple of the Sao Paulo cotton is remarkably uniform. Practically all of it is 1-inch staple and falls within a range of 1/16 inch above or below. Gins have only the ordinary cleaning equipment, but, because most of the crop is harvested during the dry season, the grade is high.

A few years ago, it was reported that spinners discriminated against Sao Paulo cotton as much as 1 to 2 cents per pound. For approximately a year, however, it has been selling at prices equal to or above other growths of American Upland. The standing of Sao Paulo cotton abroad is largely the result of the program of controlled seed and gin supervision followed by the State.

The operation of the Sao Paulo seed-production and distribution system is unique. The State exercises complete control over the production and distribution of planting seed. There are no private plant breeders, seed producers, or distributors operating in the State. When the experiment station develops the variety best adapted to local soil and climatic conditions, the State makes contracts with cotton growers who multiply the seed of that variety. A sufficient acreage is under contract to multiply enough seed each year to supply the entire State with planting seed. The seed from the contract farms is delivered at receiving centers throughout the State. A germination test is run on each lot of seed. It is cleaned, delinted, bagged, and labeled. Distribution to farmers is made from these centers. The price of the seed includes a premium on a hail-insurance policy. In this way, all the cotton acreage of Sao Paulo is covered by hail insurance.

Officers of the Department of Agriculture are able to change the variety of cotton grown over the entire State in 3 years. At the present time the experiment station is releasing a new variety of cotton that will eventually replace the older varieties. This variety is now known as Campinas 817. It is said to be better adapted to soil and climatic conditions than the present varieties.

## Insects

Insect damage is an important factor in the wide fluctuations of annual yields. Since production has spread over most of the State, the loss from insects has increased. Definite data are not available, but

it is estimated that insects cut yields by 10 to 50 percent. This loss is caused by a number of destructive insects. The more important ones are the pink bollworm (*Platyedra gossypiella*), cotton root borer (*Gasterocercopdes brasiliensis*), and the cotton leaf caterpillar (*Alabama argillacea*).

While the pink bollworm causes a great deal of damage, it is probably not as destructive as it was a few years ago. This is, no doubt, due to the control measures in effect. All seed is fumigated and a good deal of precaution is used in destroying the plants in the fields after harvest. At the present time, the cotton root borer seems to be the most destructive cotton insect in Sao Paulo. It has been known for many years, but no effective method of control has been developed. About the best method seems to be to destroy all plants after harvest, keep the fields clean, and rotate crops. In some fields, this insect damages 50 to 70 percent of the cotton plants.

The cotton leaf caterpillar is probably the most widespread of the major insects. Some estimates place the damage by this insect at from 10 to 25 percent annually. The only form of control followed is to spray the crop two or three times a year with calcium arsenate, lead arsenate, or other poison.

There are several other insects, such as cotton stainers, cutworms, grasshoppers, ants, and aphids that cause damage from year to year.

The average cotton farmer has little defense against the damage of insects and plant diseases since he practices little, if any, insect control.

## Transportation

The railroads of Sao Paulo are sufficient to take care of present cotton production and any foreseeable increase in the immediate future. The roads were originally built to accommodate the vast coffee traffic. They fed into the city of Sao Paulo and through Sao Paulo to the port of Santos. While these roads are far from modern in many respects, they serve the purpose.

The highway leaves much to be desired. There is perhaps less than a hundred miles of paved roads in the State outside the city limits. Some of the main roads are reasonably well graded, but most roads are little more than trails.

Large landowners are not very enthusiastic about the improvement and development of highways. For years, they have used the railroad for travel from their farms to the cities. Many of them apparently are content to continue this and look with disfavor on highway construction because it might increase their taxes. There is also evidence of a feeling on the part of some landowners that, with the construction and improvement of highways, it will be difficult to keep labor on the land. With highways available, a plantation would be less isolated than at present, and "farm hands" might move from farm to town or from farm to farm. If transportation facilities were available, the opportunity of



getting higher wages in other parts of the State might cause many workers to move about over the State. The public is becoming more sensitive to the inadequacy of the highways, however, and there is a growing demand for improvement.

In spite of the condition of the roads, a great deal of the cotton is moved by trucks. Individuals or cotton ginners operate trucks throughout the cotton-growing sections of the State. Much of the seed cotton is trucked to railroad stations where it is shipped to gins.

### Ginning and Marketing

There are more than 300 gins in Sao Paulo. Most of them are modern, relatively new, and of United States manufacture.

Practically all of them are located at railroad points. Because of the rapid shift of cotton growing from the east to the west, a number of gins that were built in the 1930's are now in rather poor locations; that is, cotton production in the immediate area has declined and some gins are no longer able to draw the supply of cotton necessary for profitable operation. In order to overcome this situation, seed cotton is often shipped rather long distances over the railroads.

A Government agent whose duties and powers are defined by law is located at each gin. The object of this supervision is to prevent malpractices that work to the general detriment of the entire industry. As may be expected, there is some adverse criticism of this system. Some ginners do not approve of the principle of Government supervision of ginning operations. Others who agree with the principle object because they feel that the agent is not competent or qualified. Regardless of its limitation, however, the system seems to have been responsible for eliminating and suppressing a number of malpractices.

The Government agent at the gin is required to draw a sample from each bale and forward it to Sao Paulo. Here it is classed and certified by a staff of Government classers working under a cooperative agreement between the State and Federal Governments and the Bolsa de Mercadorios de Sao Paulo (the local cotton exchange). This classification is the basis for sale of cotton to local spinners and for determining the export value. Exporters do not necessarily sell in foreign markets on this classification, although some sales on this basis are reported.

The average Brazilian bale is approximately 45X20X25 inches and weighs about 385 to 400 pounds net. It is wrapped in cotton bagging and bound with steel ties. The tare is approximately 7 pounds. All of the gins are equipped with presses that press the cotton to a density of approximately 28 to 30 pounds per cubic foot. A number of gins, however, are able to press the cotton to a density of 35 to 40 pounds per cubic foot. Such cotton does not require further compressing in order to meet requirements for shipping on ocean-going vessels.

Many of the gins are owned by independent operators, but there are a number of "line gins" in the State, some of which are owned by exporters and operators of cottonseed-oil mills. In a few cases, exporters or oil-mill owners rent or lease the cotton gins that they operate.

Practically all the cotton grown in Sao Paulo is sold in the seed by producers. Ginners, therefore, become cotton buyers. However, there is often a buyer between the farmer and the ginner. This man usually has little capital. He is, in fact, a deliveryman as well as a buyer. He buys from the farmer, transports the cotton to the gin, and resells it to the ginner. He hopes to make a profit on the transaction as well as to be paid for the operation of his truck. There is often a close working relationship between ginners and truck operators. A certain amount of capital is required, which is often supplied to the truck owner by the ginner, who, especially if he is an independent ginner, may borrow from large central-market merchants.

The ginner is an important link in the financing of the farmer. He may lend money to the truck driver-buyer who lends to the farmer. In some cases, the ginner finances farmers directly. As a rule, commercial banks do not make loans directly to cotton growers. The banks seem willing to lend to coffee producers and handlers but appear hesitant about making loans directly to cotton growers or small ginners. In any case, regardless of who makes the loan the interest rate is high. The rate is seldom less than 12 percent and often is as high as 25 percent.

Ginners need considerable storage space for both ginned and unginned cotton. Most ginners, however, do not have sufficient storage to take care of all of the cotton that may accumulate during the ginning season. Much of it is stacked in the open yard.

Most of the seed cotton is moved in jute bags, which hold about 75 to 100 pounds. These bags are filled by the farmer in the field and are handled much as grain or coffee bags. The ginning season is much longer than the picking season. Some gins operate 8 to 9 months a year. As a rule, seed cotton is not insured, and some large losses have occurred as a result of fire, theft, and rain.

After the cotton is ginned, practically all of it passes through the Sao Paulo market. Development of the central market in Sao Paulo predates the cotton expansion of the early 1930's, but the present marketing rules and practices are largely the outgrowth of experience since 1930.

The warehouse and storage facilities in Sao Paulo appear to be adequate to handle a normal cotton crop. Many warehouses that were originally used for coffee are now used for cotton storage. Large cotton warehouses have also been built in Sao Paulo.

A number of compresses are in operation in the State. In fact, what is said to be one of the largest compresses in the world is located near the city limits of Sao Paulo. This press is capable of pressing cotton to a density of about 40 pounds per cubic foot. All export cotton is pressed to approximately this density, either at a compress or at the gin.

## EXPORTS

Since the rise of the cotton-growing industry in Sao Paulo, cotton has been an important item in the export trade of Brazil. Cotton exports

have accounted for a significant part of the Brazilian foreign trade since 1934. During the 1930's, the Brazilian Government policy of allowing varying favorable rates of foreign exchange in connection with the exportation of cotton indicated the interest of the Government in cotton as a new export crop. Exports from Sao Paulo increased rapidly and exceeded 1 million bales in 1940-41 (table 2). During the latter part of World War II, exports declined drastically and domestic consumption increased. Production of cotton in Sao Paulo also decreased during this period. After the end of the war, cotton again moved into foreign markets in heavy volume. Exports from Sao Paulo in 1945-46 were 1,400,000 bales, or approximately 1 million bales in excess of the 1944-45 figure.

Great Britain has been one of the principal markets for Sao Paulo cotton. Just before the war, Canada purchased large supplies of this cotton. Japan was also an important importer of Sao Paulo cotton, but this trade was cut off by the end of 1941. Since the war, Great Britain,

TABLE 2. - Brazilian cotton exports: Sao Paulo, all other States, and total, calendar years 1930-38, crop years 1939-40 through 1948-49

YEAR	SAO PAULO	ALL OTHER STATES	TOTAL
	<sup>1</sup> Bales of 500 lbs.	<sup>1</sup> Bales of 500 lbs.	<sup>1</sup> Bales of 500 lbs.
Beginning January 1:			
1930 . . . . .	258	107,472	107,730
1931 . . . . .	295	37,948	38,243
1932 . . . . .	-	4,584	4,584
1933 . . . . .	2,892	269,579	272,471
1934 . . . . .	289,047	457,163	746,210
1935 . . . . .	262,486	480,379	742,865
1936 . . . . .	610,762	470,322	1,081,084
1937 . . . . .	702,539	444,030	1,146,569
1938 . . . . .	922,966	685,982	1,608,948
Beginning August 1:			
1939-40 . . . . .	779,749	201,308	981,057
1940-41 . . . . .	1,150,441	182,097	1,332,538
1941-42 . . . . .	795,220	61,017	856,237
1942-43 . . . . .	445,657	6,277	451,934
1943-44 . . . . .	520,790	11,941	532,731
1944-45 . . . . .	454,512	6,050	460,562
1945-46 . . . . .	1,404,030	57,654	1,461,684
1946-47 . . . . .	1,459,979	57,200	1,517,179
1947-48 <sup>2</sup> . . . . .	924,670	124,459	1,049,129
1948-49 . . . . .	642,950	45,955	688,905

<sup>1</sup> Gross weight.

<sup>2</sup> August-February, inclusive.

Source: Crop years, Economic and Financial Statistical Service, Ministry of Finance, Brazil. (From U. S. Consular Reports.) Calendar years, Anuario Algodoeiro, Brazilian Ministry of Finance.



China, Italy, and Spain have been the principal markets for Sao Paulo cotton.

The export business is largely in the hands of large firms of international character, organized under Brazilian law. Some of them have offices in the United States and might be called American firms. They export Sao Paulo cotton in much the same manner that they export American cotton. In fact, a considerable part of their business is with foreign customers who, a few years ago, were buying only United States cotton.

## OUTLOOK AND CONCLUSIONS

The decline in the acreage of cotton in Sao Paulo since 1944-45 was not due to a shortage of suitable land. Naturally, as the State was settled, the better areas were cleared and planted to crops first, but there are still thousands of acres in both the old and new areas of the State that could be planted to cotton. Some of this land lies at long distances from railroads or highways and is not of top fertility, but if labor and transportation were available it could be made to produce cotton.

In the older areas, and to some extent in the newer ones, much of the soil fertility has been destroyed by erosion. Over large areas the soil has been depleted, the forests destroyed, and the land abandoned. These lands could be rebuilt and restored but to do so would require considerable time, knowledge, and patience. Thus, such action is not expected, as there is still plenty of land for the expansion of cotton acreage, other factors being favorable.

A combination of unfavorable weather conditions may result in low yields for a single or a series of years, while, on the other hand, favorable weather may bring about years of high yields. On the whole, climatic conditions appear to be as favorable as in most rain-grown areas of equal size in other parts of the world.

The availability of labor is, and probably will continue to be, one of the most important factors limiting the production of cotton in Sao Paulo. As long as the farm labor can go to the cities and towns and earn three to five times the wages paid on the farms it will be extremely difficult to keep a full force of farm hands. A reduction in the demand for labor in the cities and towns, however, could start a movement back to the land. In the future the labor supply may be supplemented by increased immigration both from abroad and from the northeastern States.

If the income from coffee should decline, there is every possibility that much labor now employed in coffee production would be directed to cotton growing. In years of good coffee prices, as at present, coffee plantation owners clear land and plant young coffee trees. When prices are good they are able to hire the labor necessary to cultivate and bring these trees into production, which usually requires about 5 years. In periods of low coffee prices, they are not prepared to spend money on labor that will bring no returns. They will, therefore, turn a part

of their labor to the production of cotton because cotton will produce a return annually whereas new coffee plantings would not produce a revenue for 5 years.

The tight labor situation may continue for some time, but there is also a possibility that the labor supply will increase in the years ahead. The influence of this increase may not be felt immediately. It will develop gradually unless there is a drastic upheaval of the economic conditions in the country. In that case, a labor supply of considerable size may become available within a short period of time.

The Brazilian Government policy has been one of favoring large exports of agricultural products. The Government has been "coffee minded" for 150 years or more, notwithstanding the fact that coffee exports were low for many years.

Development of a favorable Government attitude toward cotton as an export crop is comparatively recent, but the indications are that cotton exports will continue to be looked upon with favor. Although coffee will remain the primary export crop, the movement of cotton into foreign markets will receive consideration in the formulation of Government trade policy. Should the price of cotton in international markets reach the point where Brazilian exporters experience difficulty in selling, it is believed that the Government will not hesitate to again give assistance as was done with the price-support program instituted during World War II. This program is still in effect, but it is now inactive because market prices are above the support prices. There is no reason to expect that if the occasion again arises the Government will discontinue its policy.

The range of average yields per acre indicates that there is ample opportunity to increase production through improving yields. Some effort is being made to do this by developing high-yielding varieties, improving cultural and soil conservation practices, and using more insecticides and fertilizing more extensively. At the present time, a variety (Campinas 817) of cotton said to be superior to the present varieties is being distributed throughout the State. By the control of planting seed, the State is able to place this variety into the hands of the farmers in a short time. The task of increasing yields by other methods will not be so simple a matter. Some effort is being made in this direction, but few farmers are being reached.

The influence of the local mill demand is a factor in maintaining cotton production, but Brazilian mills provide a market for less than half of the total Sao Paulo crop. A large part of the crop, therefore, depends upon export markets for an outlet. The presence of large international exporting firms in the State, which not only merchandize cotton but also control a large part of the ginning and warehousing industry, tends to maintain cotton production. Many of these merchants have heavy financial investments and will, therefore, make an effort to protect them. Some of the merchants may go into large-scale production, using the best mechanical equipment they can obtain. An increase in the use of tractors and machinery for this type of operation is possible within

the next few years. Cotton will not necessarily have to become more profitable to bring this about. Merchants and ginneries, through direct or indirect action, will attempt to maintain or increase cotton acreage in the areas where they have gins, oil mills, warehouses, or other cotton facilities.

On the whole, cotton production in the state of Sao Paulo can be expected to continue to increase from present level. The size of the crop will fluctuate from year to year, but, under prevailing conditions, production should approach the prewar level within a few years. Physical facilities are sufficient to handle a crop considerably above the prewar level, but, a crop of that size is not likely to be produced for some years unless there is a change in the economic situation that makes more farm labor available.

Exports of Brazilian cotton, mostly from Sao Paulo (table 2), are not expected to average as high during the next few seasons as they have since the close of World War II. Much of the cotton exported from Brazil in the postwar period came from stocks that accumulated during the war and those stocks have now been reduced to relatively low levels. Brazilian mills are currently using more cotton than they did in the prewar period. This also affects the quantity available for export.



